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10/622,217	07/18/2003	Khawar M. Zuberi	M1103.70194US00	4643
45840 7590 12/05/2007 WOLF GREENFIELD (Microsoft Corporation) C/O WOLF, GREENFIELD & SACKS, P.C. 600 ATLANTIC AVENUE BOSTON, MA 02210-2206			EXAMINER SURVILLO, OLEG	
			ART UNIT 2142	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/622,217

Applicant(s)

ZUBERI, KHAWAR M.

Examiner

Oleg Survillo

Art Unit

2142

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 July 2003 and 16 March 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 24, 2007 has been entered.

### ***Response to Amendment***

2. This Office action is responsive to the amendment filed on August 24, 2007. Claims 1-28 remain in the application. Claims 1, 8, 15, and 22 are amended herein. There are no newly added or canceled claims.

### ***Response to Arguments***

3. With regard to the Applicant's remarks filed on March 16, 2007:

Regarding the objection to the specification in paragraphs [0024] and [0037], applicant's amendments have been considered and are deemed sufficient. Therefore, said objection has been withdrawn.

Regarding the objection to the specification under 35 U.S.C. 132(a) for introducing new matter into the disclosure, applicant's amendments to the specification to cancel the changes made by the Amendment filed on March 16, 2007 have been

considered, but are not deemed sufficient. Therefore, said objection is maintained as explained under section "Specification".

Regarding the objection to claim 1, applicant's amendment has been considered and is sufficient, therefore, said objection has been withdrawn.

Regarding the rejection of claims 1, 4-7, 15, and 18-21 as being anticipated by Boyd et al. (Patent No.: 6,721,806), the arguments have been considered but are moot in view of the new grounds of rejection.

### ***Specification***

4. The amendment to paragraph [0004] of the specification in the response filed on March 16, 2007 (which is repeated in the response filed on August 24, 2007) is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure.

35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention.

In the Office action mailed on December 18, 2006, examiner made an objection to the specification citing the reference named "RDMA Protocol Verbs Specification", which teaches a method of generating STags that appears to be inconsistent with the disclosure of the present application. The examiner required correction to paragraph [0004] of the current specification that was amended by the applicant in the response filed on March 16, 2007. However, it appears that amendment to paragraph [0004] of

the current specification introduces new matter into the disclosure since the present application, as filed, did not disclose having a consumer generating an STag.

Therefore, the objection to the specification made in the Office action mailed on December 18, 2006 has been withdrawn and will not be introduced upon canceling the changes to paragraph [0004] of the specification.

Applicant is advised to amend paragraph [0004] of the specification to cancel the changes required by previously made objection to the specification. Paragraph [0004] of the specification should read: "a NIC in the first machine generates the STag." as originally presented. Presently made objection under 35 U.S.C. 132(a) will be withdrawn upon canceling the changes to par. [0004].

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 4-7, 15, 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boyd et al. (US 6,721,806 B2) in view of Applicant's admitted prior art.

As to claim 1, Boyd shows a method for transferring control [switchover] between a first network interface and at least a second network interface [IPSOE (118) and (120)] in a multiple network interface device [a host processor node (102) all in Fig. 1,

where IPSOE is used to interface to IP net (100) (col. 5, line 38)], after the first network interface sends an identifier [a send work queue (402) wherein each of the send work request's data segments contains part of a virtually contiguous memory region (col. 8, lines 38-48) specified by DDP/RDMA header (622)], the identifier associated with a memory location in the multiple network interface device [DDP/RDMA header (622) that specifies the message identifier and the placement information for the data payload (col. 11, lines 10-14)], to a second device [host processor node (704) in Fig. 7], the identifier and an associated data field capable of being received by the second network interface (col. 11, lines 36-55), the method comprising:

- receiving a message from the second network interface by a program component, the message indicating the reception of the identifier and the associated data field from the second device [receive work queue (400) containing work queue elements (WQEs) (416-420), describing where to place incoming channel semantic data from the IP net fabric (col. 8, lines 16-22) wherein a program component comprises a message and data service (224) that receives and processes messages from the second network interface comprising IPSOE (212) (col. 7, lines 11-23)];

- passing the identifier to the program component [having a message and data service (224) that receives and processes messages and data received through the second network interface (col. 7, lines 11-23) wherein a message comprises a message identifier (col. 10 lines 58-67 and col. 11 lines 1-14)];

- querying the first network interface to supply the program component with a list of identifiers [the range of QP numbers, CQ numbers, and the range of Memory

Translation and Protection Table (col. 21, lines 20-24) which provide a list of identifiers and associated memory locations (col. 7, lines 39-44; col. 16, lines 1-40)] sent by the first network interface and associated memory locations in multiple network interface device memory [(col. 21 lines 6-12) wherein the host comprises the program component (col. 7 lines 17-24)];

identifying, by the program component, that the first network interface sent the identifier [having RNIC Identification context information (1240) as a part of QP (1172) that uniquely identifies RNIC, which sent/received a message comprising the identifier (col. 16 lines 24-28 and col. 19 lines 1-10)]; and

transmitting a memory location associated with the identifier to the second network interface [sharing QP, CQ, and Memory TPT range between primary and alternate RNICs (col. 14 lines 22-67 and col. 15 lines 1-55)], wherein the second network interface is capable of transmitting the associated data field to the memory location associated with the identifier [switching all outstanding connections to an alternate RNIC (col. 2, lines 59-61 and col. 21 lines 13-19)].

Boyd does not show that the second network interface has no knowledge of the identifier and the associated data field, and that the first network interface generated the identifier.

Applicant's admitted prior art shows that the second network interface has no knowledge of the identifier and the associated data field [machine 2 will return data with an STag that is unknown to NIC 2] (par. [0005] of the Background of the Invention), and

that the first network interface generated the identifier [NIC 2 will have no knowledge of a STag generated by NIC 1] (par. [0005] of the Background of the Invention).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Boyd and Applicant's admitted prior art wherein the second network interface has no knowledge of the identifier generated by the first network interface in order to provide switchover and switchback between two network interfaces when planned or unplanned outage occurs on a primary network interface (abstract of Boyd).

As to claim 4, Boyd shows a computer readable media comprising a memory location to be a random access memory (col. 35, line 3).

As to claim 5, Boyd shows a program component being a computer operating system (col. 7, lines 14-17).

As to claim 6, Boyd shows the first and second network interfaces operating under RDMA protocol (col. 2, lines 55-57).

As to claim 7, Boyd shows the first and second network interfaces operating under RDMA protocol over TCP/IP protocol (col. 2, lines 33-35).



As to claim 15, Boyd in view of Applicant's admitted prior art shows instructions stored on a computer readable medium (col. 35, lines 1-5 in Boyd) capable of performing the recited steps of claim 1.

As to claims 18-21, Boyd in view of Applicant's admitted prior art shows instructions stored on a computer readable medium (col. 35, lines 1-5 in Boyd) capable of performing the recited steps of claim 1 and further showing the additionally recited elements, as discussed regarding claims 4-7.

7. Claims 2-3, 8-14, 16-17, 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boyd et al. in view of Applicant's admitted prior art and in further view of the Internet Draft document "RDMA Protocol Verbs Specification" by Jeff Hilland.

As to claim 8, Boyd shows a method for transferring control [switchover] between a first network interface and at least a second network interface [IPSOE (118) and (120)] in a host computer including the first network interface and the second network interface [a host processor node (102) all in Fig. 1, where IPSOE is used to interface to IP net (100) (col. 5, line 38)], the method comprising:

receiving an identifier from a remote computer by the at least a second network interface, the identifier sent by the first network interface and associated with a memory location in the host computer [receive work queue (400) containing work queue elements (WQEs) (416-420), describing where to place incoming channel semantic data from the IP net fabric (col. 8, lines 16-22) wherein a program component comprises a

message and data service (224) receiving and processing messages from the second network interface [IPSOE (212)] (col. 7, lines 11-23) and wherein the first network interface sends an identifier [a send work queue (402) wherein each of the send work request's data segments contains part of a virtually contiguous memory region] (col. 8, lines 38-48) specified by DDP/RDMA header (622), the identifier associated with a memory location in the multiple network interface device [DDP/RDMA header (622) that specifies the message identifier and the placement information for the data payload] (col. 11, lines 10-14));

sending a message to a program component indicating the reception of the identifier [having a message and data service (224) that receives and processes messages and data received through the second network interface (col. 7, lines 11-23) wherein a message is comprising a message identifier (col. 10 lines 58-67 and col. 11 lines 1-14)], the program component configured to query the first network interface for a list of identifiers sent by the first network interface and associated memory locations in the host computer [querying the first network interface for the range of QP numbers, CQ numbers, and the range of Memory Translation and Protection Table (col. 21, lines 20-24) which provide a list of identifiers and associated memory locations (col. 7, lines 39-44; col. 16, lines 1-40), sent by the first network interface and associated memory locations in the host computer (col. 21 lines 6-12)];

passing the identifier received from the remote computer to the program component [having a message and data service (224) that receives and processes messages and data received through the second network interface (col. 7, lines 11-23)

wherein a message is comprising a message identifier (col. 10 lines 58-67 and col. 11 lines 1-14) from the remote computer comprising node (704) Fig. 7];

receiving a memory location associated with the identifier [sharing QP, CQ, and Memory TPT range between primary and alternate RNICs (col. 21 lines 20-67) where the alternate RNIC is transmitting the associated data field to the memory location associated with the identifier in case of primary RNIC outage (col. 2, lines 59-61)].

Boyd does not show that the second network interface has no knowledge of the identifier and the associated data field, and that the first network interface generated the identifier. Boyd also does not show searching the list of identifiers for the identifier, and, based on the result from the searching step, invalidating the identifier received from the remote computer if the list of identifiers does not include the identifier received from the remote computer.

Applicant's admitted prior art shows that the second network interface has no knowledge of the identifier and the associated data field [machine 2 will return data with an STag that is unknown to NIC 2] (par. [0005] of the Background of the Invention), and that the first network interface generated the identifier [NIC 2 will have no knowledge of a STag generated by NIC 1] (par. [0005] of the Background of the Invention).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Boyd and Applicant's admitted prior art wherein the second network interface has no knowledge of the identifier generated by the first network interface in order to provide switchover and switchback between two network

interfaces when planned or unplanned outage occurs on a primary network interface (abstract of Boyd).

Boyd in view of Applicant's admitted prior art does not show searching the list of identifiers for the identifier, and, based on the result from the searching step, invalidating the identifier received from the remote computer if the list of identifiers does not include the identifier received from the remote computer.

Hilland shows searching the list of identifiers for the identifier [using a STag by RNIC Interface (RI) when handling RDMA operations to identify a memory location within a specific Memory Region (page 89 lines 42-48) wherein a memory region is associated with a Physical Buffer List through the STag] (page 13 line 51). Hilland also shows invalidating an identifier [STag, to prevent RNIC from accessing memory locations via the STag associated with that Memory Region] (page 112, lines 28-30).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Boyd in view of Applicant's admitted prior art by including the steps of searching the list of identifiers for the identifier and invalidating the identifier if the list of identifiers does not include the identifier in order identify the memory location associated with the identifier and de-allocate the identifier if it is associated with an invalid Memory Window (MW) (page 28 Fig. 3 in Hilland).

As to claims 2 and 9, Boyd in view of Applicant's admitted prior art and in further view of Hilland shows the identifier being invalidated by the operating system (page 90,

lines 8-12 in Hilland). It is inherent that the identifier is being invalidated by changing a validation field in RDMA header (622) as showed in the RDMA protocol specification for the purpose of invalidating identifiers that are no longer useful (RDMA protocol specification, page 20, lines 32-41).

As to claims 3 and 10, Boyd in view of Applicant's admitted prior art and in further view of Hilland shows that invalidating STag identifier will prevent RNIC from accessing the memory location that STag is associated with (Page 112, lines 28-31 in Hilland).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Boyd in view of Applicant's admitted prior art by dropping or discarding the message data associated with the identifier (Fig. 6 in Boyd) if it cannot be successfully placed in the memory location due to invalidated identifier.

As to claim 11, Boyd shows a computer readable media comprising a memory location to be a random access memory (col. 35, line 3).

As to claim 12, Boyd shows a program component being a computer operating system (col. 7, lines 14-17).

As to claim 13, Boyd shows the first and second network interfaces operating under RDMA protocol (col. 2, lines 55-57).

As to claim 14, Boyd shows the first and second network interfaces operating under RDMA protocol over TCP/IP protocol (col. 2, lines 33-35).

As to claim 16, Boyd in view of Applicant's admitted prior art and in further view of Hilland shows instructions stored on a computer readable medium (col. 35, lines 1-5 in Boyd) capable of performing the recited steps of claim 1, and further showing the additionally recited elements, as discussed regarding claim 2.

As to claim 17, Boyd in view of Applicant's admitted prior art and in further view of Hilland shows instructions stored on a computer readable medium (col. 35, lines 1-5 in Boyd) capable of performing the recited steps of claim 16, and further showing the additionally recited elements, as discussed regarding claim 3.

As to claims 22-23, 25-28, Boyd in view of Applicant's admitted prior art and in further view of Hilland shows instructions stored on a computer readable medium (col. 35, lines 1-5 in Boyd) capable of performing the recited steps of claim 8, and further showing the additionally recited elements, as discussed regarding claims 9, 11-14.

As to claim 24, Boyd in view of Applicant's admitted prior art and in further view of Hilland shows instructions stored on a computer readable medium (col. 35, lines 1-5 in Boyd) capable of performing the recited steps of claim 22, and further showing the additionally recited elements, as discussed regarding claim 23.

***Conclusion***

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

"RE: [rddp] comments on draft-black-rdma-concerns-00.txt" document by Caitlin Bestler bearing a date 31 July, 2002 appears to be relevant to applicant's disclosure. In particular, Bestler discusses how the STag scope might be made variable, wherein a protection domain can be NIC wide, one connection or anything in between. Bestler shows that the InfiniBand model is missing the ability to create an STag that is valid across multiple NICs. Bestler also provides a solution to this problem, wherein "the local interface should allow the ULP to request a specific STag value. The ULP would still have to map each NIC to the same memory" (printout of Bestler's email document is enclosed with this Office action).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Oleg Survillo whose telephone number is 571-272-9691. The examiner can normally be reached on M-Th 7:30am - 5:00pm; F 7:30am - 4:00pm EST.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Caldwell can be reached on 571-272-3868. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Examiner: Oleg Survillo  
Phone: 571-272-9691

  
ANDREW CALDWELL  
SUPERVISORY PATENT EXAMINER